DRIVER

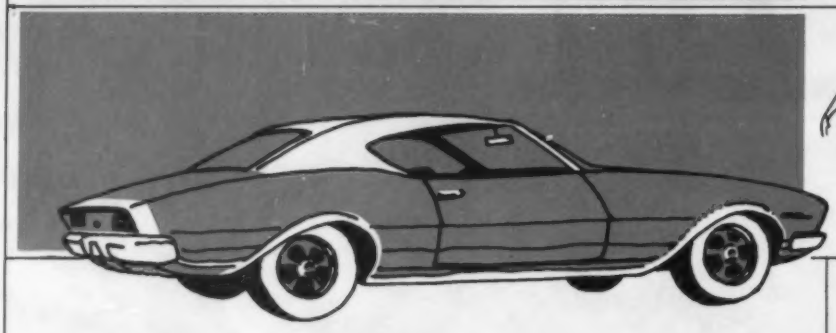
FEBRUARY 1980

a little LIGHT on the subject

REFLECTIVES

HALOGENS

DRiVER



This Lifesaver banner attaches to vehicles of all sizes and is intended as a substitute for flares and reflective triangles. The Lifesaver's directional arrows are "Day-Glo Blaze Orange" outlined in reflective silver and are visible for hundreds of yards, both day and night. The banner is weatherproof and re-usable for many years. (GSA Special Item Number NIS-G-4821)

Traffic is moderate and you're cruising down the road at the legal speed limit. Suddenly you glimpse "something" appear from out of the shadows and start to cross the road about 165 feet ahead on your right.

You have just a fraction over two seconds to (1) PERCEIVE the danger, (2) RECOGNIZE what it is, (3) DECIDE what to do about it, (4) REACT physically, and (5) EVADE an accident.

1. perceive

Note that those two-plus seconds depend first on your eyes. You must *really see* whatever it is that's up ahead. Ninety per cent of driving decisions depend on the eyes sending messages to the brain and the brain receiving those messages. That's one of the reasons we spend so much time talking about scanning, trying to keep a space cushion around the vehicle, and continuously watching for escape routes. These activities keep the brain actively engaged in receiving the messages from the eyes. If your eyes see that "something" up ahead but your brain is loafing around chuckling over what Mork said to Mindy, forget the two-plus seconds. In that case, there's no time at all.

SEEING ...BEING SEEN

A vehicle traveling at 55 mph is moving along the highway at 80.7 feet per second or nearly 8.1 feet each one-tenth of one second. Since researchers estimate a minimum time lag of one-tenth second for eye-to-brain communication in actual driving emergencies, this means that another vehicle passing across your visual field or speeding toward you is perceived at least 8.1 feet behind where it is actually located physically. Such perceptual lag may well account for numerous accidents, particularly at freeway speed.

If you have ever been duck hunting, you know all about perceptual lag. The hunter who fails to lead his target sufficiently shoots behind it.

2. recognize

When the nerve impulse is first transmitted to the brain, the driver knows only that something is in his visual field. Recognition or evaluation requires still more time – a half-second. Does he see a car, a bicycle, or a girl on horseback?

3. decide

The next phase – decision-making – is the most critical time-wise. It varies from a bare minimum of .15 to .85 second under ideal conditions on up to several seconds, depending on the task involved.

Decision time is affected by the experience level of the driver. The less experienced, the longer the time needed to decide. In fact, he may not even make a decision – he may *freeze*.

4. react

Following his decision, the driver then has a minimum of .3 second to physically react. It could take precious additional seconds.

The muscular reflexes of younger drivers are extremely quick under most conditions, but inexperienced drivers haven't yet faced enough situations to have established an automatic habit pattern for a quick response. Hesitation is expensive.

5. evade

The final sequence in the human-machine, time-distance countdown is the time needed for the driver's vehicle to mechanically respond to his control inputs and then successfully change from a collision course. The estimated minimum time for these two responses is one second.

continued

DRIVER

THE
TRAFFIC SAFETY MAGAZINE
FOR THE MILITARY DRIVER

DEPARTMENT OF THE AIR FORCE
HQ AIR FORCE INSPECTION AND SAFETY CENTER
Norton Air Force Base, California 92409

Lt Gen HOWARD M. LANE
The Inspector General, USAF

Maj Gen LEN C. RUSSELL
Commander
Air Force Inspection and Safety Center

Brig Gen GARRY A. WILLARD, Jr.
Director
Aerospace Safety USAF

PUBLISHED MONTHLY IN COOPERATION
WITH
THE DEPARTMENT OF THE ARMY
AND
THE DEPARTMENT OF THE NAVY

Dr. FRANCIS S. McGLADE
Director of Safety
United States Army

RADM W.B. WARWICK
Commander
Naval Safety Center

AFRP 127-1
Controlled Circulation Permit number
USPS 448-630

SUBSCRIPTION—DRIVER is available on subscription for $12.00 per year domestic ($1.00 per copy); $15.00 per year for foreign mailing ($1.25 per copy), through the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Back issues are not available. Changes in subscription mailings should be sent to the above address. Use of funds for printing this publication has been approved by Headquarters, United States Air Force, Department of Defense, Washington, D.C. No payment can be made for manuscripts submitted for publication. Contributions are welcomed, as are comments and criticism. Address all correspondence to the Editor, DRIVER Magazine, AFISC/SEDD, Norton AFB, CA 92409.

ATTENTION DEPT OF THE NAVY PERSONNEL: Address all queries concerning distribution to NAVSAFECEN, NAS, NORFOLK, VA 23511, Attn: Safety Publications Dept. All other correspondence will be welcomed by the Editor.

The contents of this magazine are informative and should not be construed as regulations, technical orders, or directives unless stated. Address reprint requests, stating intended use of material, to the Editor. The Editor reserves the right to make any editorial changes in manuscripts which will improve the material without altering the intended meaning.

The inclusion of names of any specific commercial product, commodity, or service in this publication is for information purposes only and does not imply endorsement by the Air Force.

Certain individuals shown in this magazine are not members of the Air Force and therefore do not conform to Air Force grooming standards.

FEB

VOLUME 13 NUMBER 9

CONTENTS

Features	Page
Seeing . . . Being Seen	1
Halogens Are Here	7
Air Force Sergeant Tackles Grand Prix Track	10
Getting The Hang Of It	14
Marines Sharpening Motorcycle Safety Habits	20
Seat Belts	Back Cover
Departments	
Double Clutch	2
Double Tech	12
Timely Topics	21
How It Happens	21
The Backyard Mechanic	22
Backfire	28

COL. WARREN L. BUSCH
Chief, Safety Education Division

VIRGINIA HENDRIX
Editor

TSgt RON LATHROP
Technical Editor

JERI ROOD
Feature Editor

ALICE MILKEY
Editorial Assistant

DON KELLEHER
Art Director

LORRAINE HAMBLEN
Staff Artist

CLIFF MUNKACSY
Staff Photographer

THE EDITOR SPEAKS DOUBLE CLUTCH

A SERIOUS QUESTION

DRIVER has received a handful of letters lately which chide us kindly but firmly for printing stories about auto racing at a time when fuel conservation is so important. Do we think about the national need for reduction in the use of fossil fuels when we schedule such stories? Yes, we do. The thinking goes like this:

How much fuel did it take to jet those football teams around the country for the New Year's bowl games? How much did the fans burn driving or flying to the bowls? What about college and professional basketball? Horse racing meets? Professional baseball?

Motor racing is the only sport to actually consume fuel "in front of the camera" so to speak. But that consumption is truly small in comparison with the amount used by other sports. It is simply a lot more apparent.

The ice racing story in November drew a lot of friendly barbs on this same point of wasting fuel. After all, the ice racers were simply entertaining themselves, not millions of TV watchers. We could weasel a bit by pointing out that if a story about racing 4WD vehicles on frozen lakes goes to the printer in September, it had to have been written and photographed the previous winter, when the need to conserve fuel may have been just as real but wasn't so obvious.

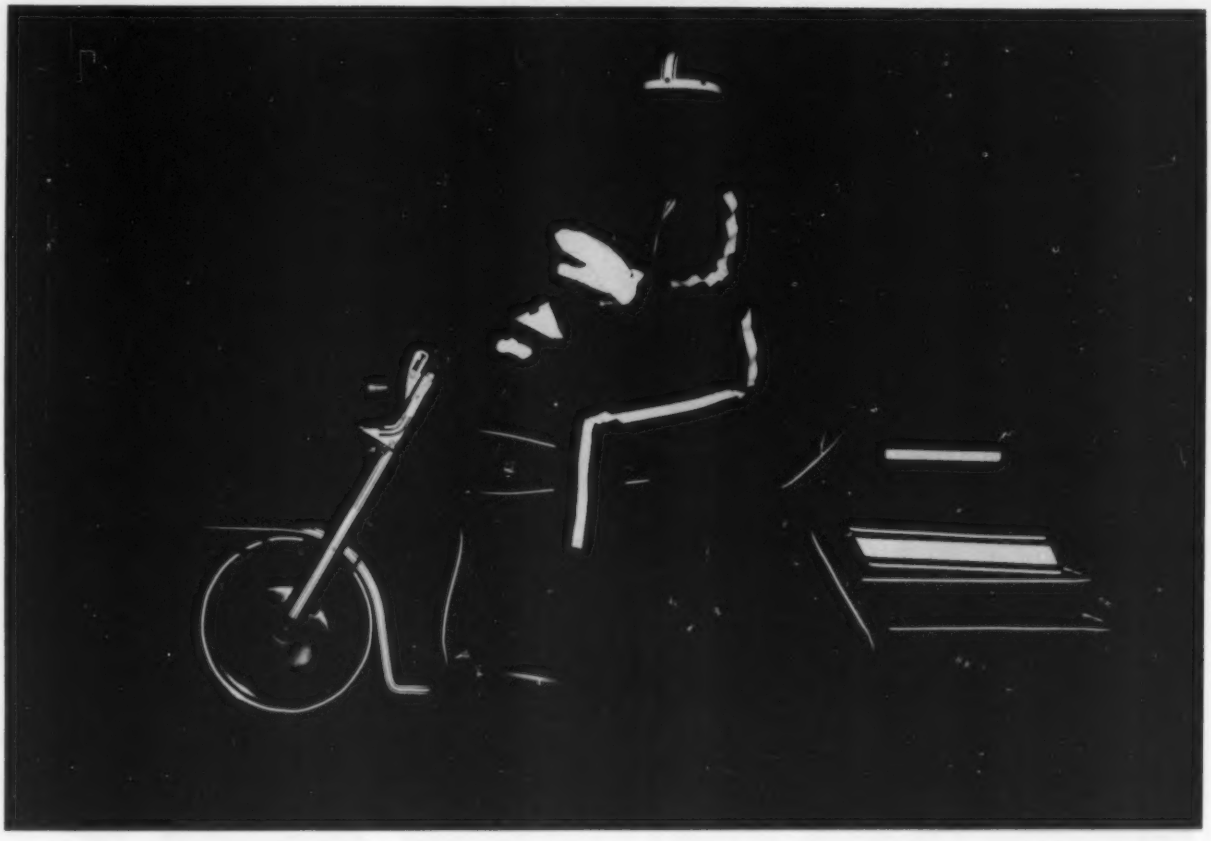
That's what we'd be doing, however. Weaseling. We published the ice racing story because it was entertaining reading and loaded with information about safe winter driving that is valuable to readers.

DRIVER really does believe motorists should curtail recreational driving. We will continue to encourage you to do

continued on page 21

seeing . . . being seen

continued



A motorcyclist can do a lot to increase his visibility to other traffic. Strips of pressure-sensitive reflective sheeting have been affixed to the cycle and helmet. Clothes are trimmed with reflective fabric. These retro-reflective materials contain up to 90,000 tiny glass beads per square inch that "bounce" light back to its source regardless of the angle from which it comes.

(Cyclists may want to dispute this vehicle response time, but remember that other mechanical reaction factors such as braking and gearing down can easily use up one second or more.)

Cars these days vary widely in their stopping abilities, but the distance for braking the average car to a stop on dry pavement at 55 mph is 167 feet.

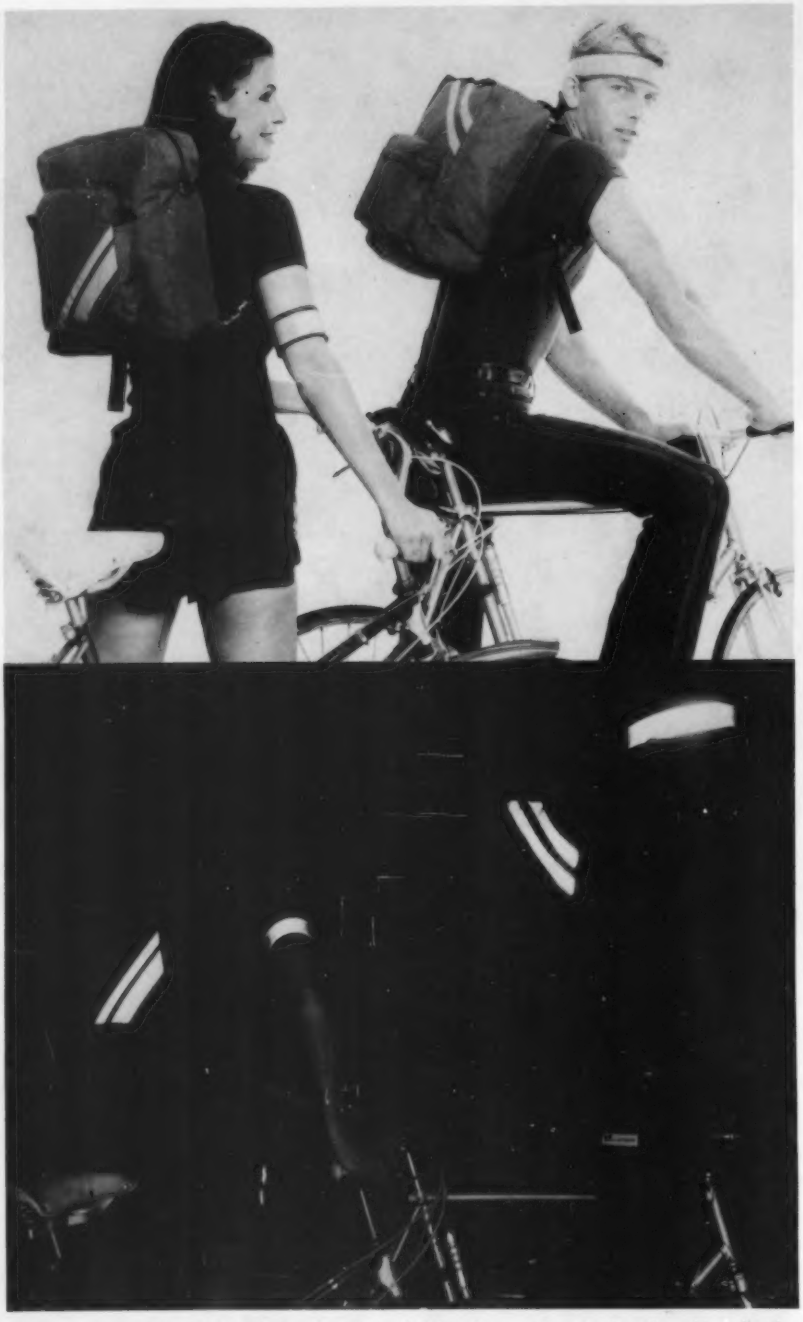
So there you have it. Two and five-hundredths seconds – the minimum combined time physiologically and mechanically for you and your vehicle to react successfully to the hazard. Chances are you'll need more time. Chances are you won't get it. But if you use your eyes correctly and are a skillful driver, you can avoid that "something" about to cross the road about 165 feet ahead.

What if you're the "something?" Now, instead of imagining yourself as the driver in this situation, put yourself in the position of being the "something" the driver has caught sight of. You are a pedestrian, a bicyclist, a jogger. Now you have the same two-plus seconds to hope that you will (1) be seen, (2) be identified, and (3) be avoided.

It all starts with *being seen*. When you select the clothes you wear for walking/jogging, bicycling, or otherwise mixing it up with cars and trucks, do you think about providing visual clues to the traffic? Do you wear bright colors in daytime and take advantage of reflectives when the sun isn't out?

On these pages we picture ready-to-wear clothing and accessories you can buy to increase your visibility. But you can make your present clothing light-reflective after dark by buying pressure-sensitive reflective tape or sheeting and applying it to your shoes, shirt, vest and hat. Add it to a headband or stick some on your gloves. You want to attract a driver's attention and give him a sufficient target by which to

continued

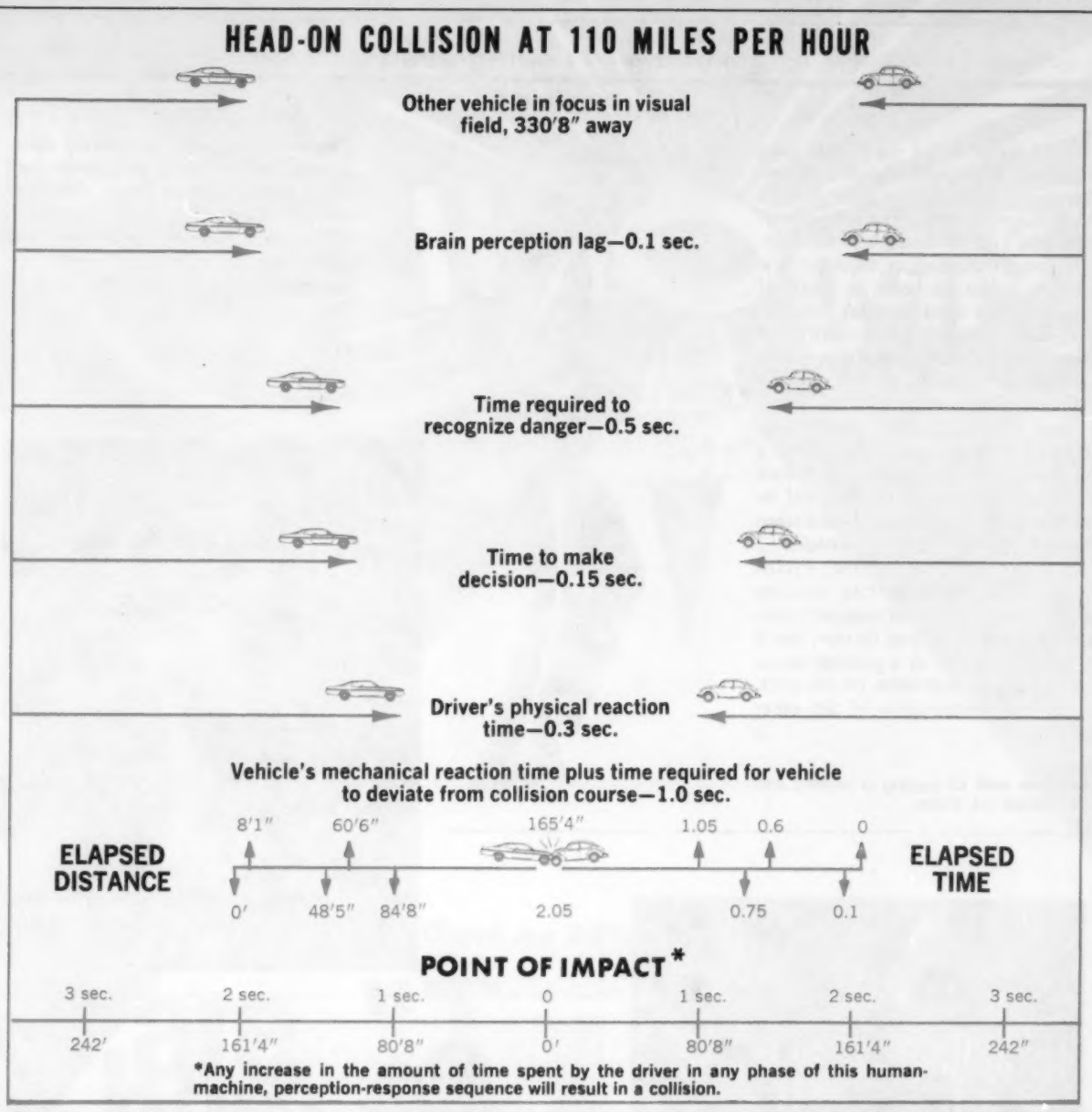


These bicyclists add to their after-dark visibility by wearing backpacks with reflective trim.

Jogging suits and headbands made of cloth with a reflective finish offer protection in the early morning as well as at night—any time motorists are driving with headlights on.

gauge your size, position and speed.

This same reflective material can make your two-wheel vehicles more visible in the dark, too. The two-wheeler has a "skinny" profile, even in good light. With only a headlight to attract his attention, a motorist may still try to turn in or pull out in front of an oncoming two-wheeler because



Collision course—This chart illustrates the estimated human-machine, time-distance relationships of two autos traveling on a head-on collision course at 55 mph or at a combined closing speed of 110 mph. An elapsed time of 2.05 seconds is the bare minimum available—under perfect conditions for both men and machines—for either driver to avoid a collision, even though each is more than the distance of a football field from the other.

he does not *recognize* what the light is. Give this fact special attention if you ride an older bicycle that doesn't have the reflectors which manufacturers have provided on newer models.

An important time for "being seen" is when your car is disabled at the side of the road. The emergency flashers are helpful, but they are subject to battery or electrical failure. You should set out flares (sometimes hard to light, with a short life) or reflective triangles (expensive). A good substitute is the Lifesaver banner, also pictured here. The Lifesaver won an award from Occupational Safety and Health Administration as the best new safety product of 1978. It is fairly inexpensive (under $10) and reusable. It can be seen both day and night and has the advantage of communication to oncoming motorists by telling them they must pass to the side the arrows indicate. (Remember that it is not advisable to remain in a disabled vehicle unless it is well off the road, even if you have put out warning devices.)

continued

seeing . . . being seen

continued

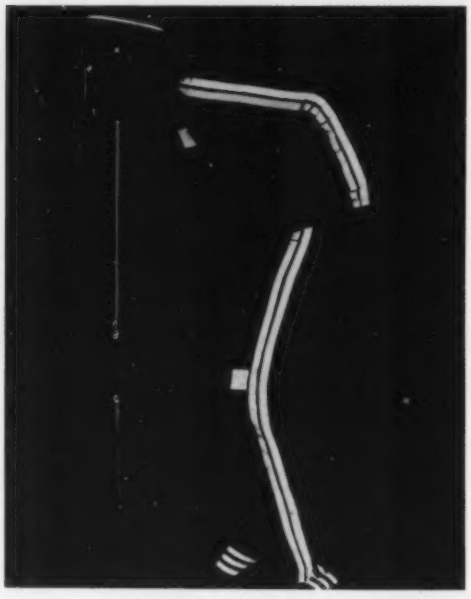
Incidentally, know your local laws regarding emergency devices. Some European countries require you to carry flares or triangles and substitutes won't do, no matter how efficient.

If you are thinking of buying a new vehicle, select its color in terms of visibility. We used to think red was best – and red is a good color – but maybe you've noticed that fire trucks are turning from red to lime yellow. White is a good color in some areas, but not necessarily where there's a lot of snow or bright sand. If you drive a lot at night, don't select black or dark green. A light, metallic blue will be more visible under most conditions than a darker blue that isn't metallic.

Whether you're a motorist, cyclist or pedestrian, do everything you can to be visible, but then imagine yourself INVISIBLE. If you do that, you'll never put yourself in a position where your safety is dependent on the eyes, brain and coordination of the other person.

(right)
Another suit for jogging or walking after dark. Notice the shoes.

The garments and accessories illustrated are available nationwide and carry such names as Sears, Catalina, Harper Industries, Jads Company, Renegade, Weathervane, Head, and Bill Rodgers. Trims and fabrics are made reflective by the 3M "Scotchlite" process.



If the snowmobile breaks down and you have to walk back, you'll be grateful for the extra safety provided by these suits.

Halogens are here

Let there be 25% more light

"To see or not to see; that is the question. / Whether 'tis better for the eyes of the driver to suffer / the strains and pains of attempting to see beyond the beam / or to take halogens against a sea of darkness, / and by lighting, see on . . ."

Actually, the question could be better stated, "To buy halogens or not to buy halogens." Recently, the National Highway Traffic Safety Administration approved the use of halogen headlights (of the "sealed beam" variety) for American automobiles. If you're anything like we were, you probably don't have much knowledge of these new (for U.S.) lights. We decided to take a short look at them, to give you some background on which to make a choice, if you feel you need to get some brighter lighting for your car.

Because that's what these new headlights provide. Halogen lights are brighter than the common U.S. incandescent headlamps, but they use less electricity to provide that brighter light. However, there are advantages and disadvantages to both sides.

There are two separate questions with two choices for each: Should I have halogen headlights or the regular incandescent kind? And should I use the sealed beam headlamps or the separate components of the European headlights?

Until that recent decision of the NHTSA, there was no choice to either question—it was incandescent sealed

continued

halogens are here

continued

beams only. (Despite what some have thought, European component-style quartz-halogen lights are not legal anywhere in the U.S. You overseas people can have them, but if you ship your car back here, you're required to get U.S.-legal sealed beams.) You'll notice the expression "quartz-halogen" above; the newly-mandated lights for the U.S. are just "halogens"—no quartz involved.

Other questions that may come up are: "Will the halogen headlights cause too much glare?" And "What is this possibility of "overdriving the headlights" that we hear about?"

We'll take a shot at answering these questions, but before it gets any more confusing, we want to explain things a little more fully. We'll start with headlights in general.

"To see, to squint no more . . ." The process is not that difficult to understand. All headlights have a thin filament made from tungsten. This element burns very slowly and gives off a very bright light. Basically, the thinner the filament, the hotter the burning and the brighter the light—but the shorter its life. The filament is contained within a bulb in an atmosphere of a gas which is inert—that is, it doesn't burn along with the filament. The light bounces off the reflector at the back of the bulb and is focused out the lens at the front.

Okay, here's where the differences come in. American headlights are called "sealed beams." That is, they are all one-piece construction—the whole headlight is a bulb filled with gas (argon or nitrogen) with a naked filament inside. Thus, as the filament burns, particles of tungsten are deposited on the reflector and the inside of the lens (both made of glass), gradually darkening the light until it burns out entirely.

At, Br, Cl, F, I: The European lights are called quartz-halogen headlights. They have three pieces—the reflector, the lens (made of quartz), and the bulb. They have a thinner filament in the bulb (and are therefore brighter) but their makers have made allowances for the shorter lifespan that should result. The small bulb, which conforms to the shape and size of the filament, is filled with one of the halogen gases—fluorine, chlorine, bromine, iodine or astatine (group VII A on the periodic table for you chemistry buffs out there)—and they slow the breakdown of the filament. These gases cause the burning tungsten particles to redeposit on the filament itself—don't ask us how, chemistry fans. Eventually the filament will burn out, of course, but it will take longer (manufacturers say halogens will last as long as the regular incandescents). And the light will be brighter in the meantime, because the lens and reflector will not be blackened by tungsten particles.

In addition, the halogen gas allows the headlight to work more efficiently—that is, less power required for the same amount of light, or the same power yields more light. To accommodate the new halogens NHTSA had to raise candlepower limits for headlights. The new limit is 150,000 candlepower (total for both lamps) on high beams, twice the old limit of 75,000. The limits on low beam are the same as before, 8000 to 20,000 candlepower per headlight.

Ready . . . aim . . . Now here's where the second question comes in—sealed beams versus the non-sealed, three-piece construction. The U.S. authorities contend that the non-sealed beam lights cannot be easily aimed. (Misaimed headlights create a lot of glare for oncoming drivers.) They also claim that the non-sealed beam lights allow dirt and contamination to get behind the lens and darken the light output. There are parties who dispute these two points, but DRIVER isn't going to get involved in the fight. The fact is, the NHTSA has mandated a sealed-beam halogen, and non-sealed beams are still illegal.

So now, let's look at the U.S.-legal halogens. They are sealed as a unit,

of course, but they are a bulb-within-a-bulb. The filament and halogen gas are contained in a small bulb (it needs to be small for that redepositing effect we talked about). The outer bulb has the regular nitrogen or argon gas and the lens and reflector are made of glass. (So it's just "halogen," not "quartz-halogen.")

The question of whether quartz makes a superior lens is another one we'll sidestep because the legal headlights here have glass lenses, not quartz. But cost is one thing we will comment on. Because the halogens are a brand-new item, they are presently quite expensive. We expect they'll drop in price drastically as they are used in more and more cars. They are available now in the U.S. on several makes of domestic and foreign cars, and of course as an aftermarket item.

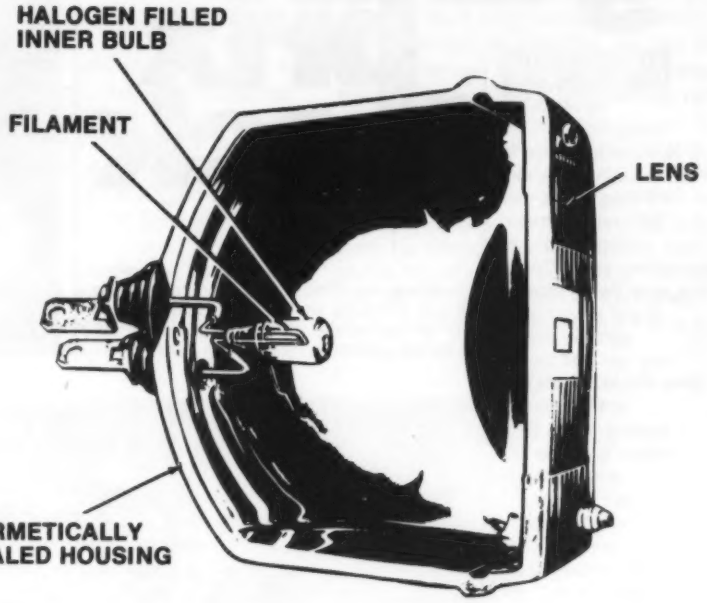
Do I need 'em? The factor of price may be the deciding one for you. But if you're still curious, what about the question of overdriving your headlights? Let's say your incandescent headlights are new and working at peak efficiency. You're traveling at 55 mph (which is 80 feet per second). On low beam, your headlights reach about 250 feet ahead, and on high beam they reach perhaps 400 to 500 feet ahead. If Ferdinand the Bull is in the roadway, your low beams give you three seconds of warning before you hit him and your high beams give you five or six seconds. That's at peak efficiency.

At least one manufacturer has claimed a 25 percent increase in range on the high beams with the halogen sealed-beam headlights. You'll have to decide for yourself whether they are what you want.

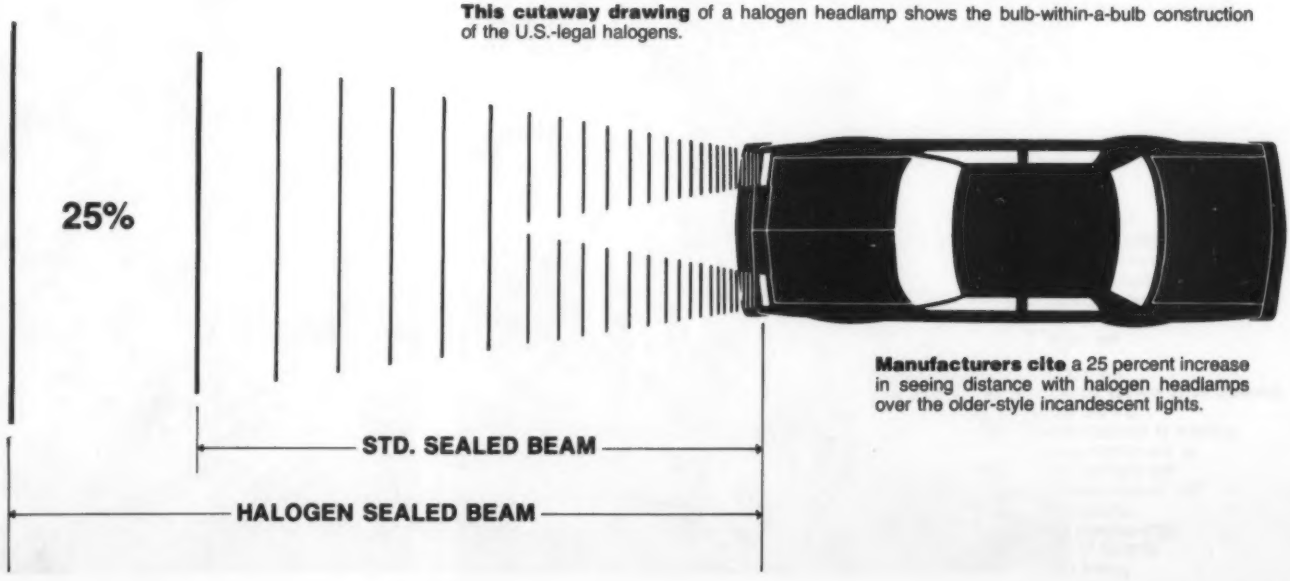
Glare: Glare from the headlights is another question you might want to consider. As we mentioned, the candlepower limit for low beams is the same as before, so glare shouldn't be a problem there. However, the new limit on high beams will probably make a noticeable difference to oncoming drivers (and to *you* if someone else has the halogens). All this means is that if you opt for the new lights, you have a special responsibility to be courteous to others. If you see oncoming drivers, dim your lights far in advance of encountering them. They will be grateful.

Light puns: We hope we've "shed a little light on the subject" of halogen headlights (pun definitely intended). Your friendly neighborhood car dealer or lighting salesman will have more information for you about their availability. And we'll provide further illumination as we receive it.

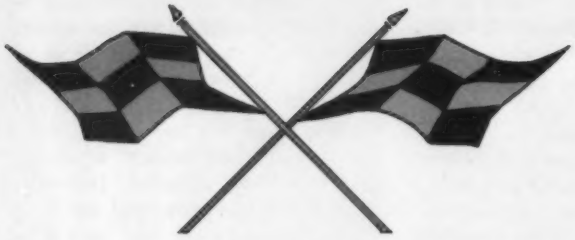
Happy candlepowers!



This cutaway drawing of a halogen headlamp shows the bulb-within-a-bulb construction of the U.S.-legal halogens.



Manufacturers cite a 25 percent increase in seeing distance with halogen headlamps over the older-style incandescent lights.



Air Force Sergeant tackles

grand prix track

EDITOR'S NOTE: Motor sports have never been inexpensive. This is especially true in today's rapidly inflating economy. With recent motor racing headlines screaming about Team McLaren being unable to get a six-figure sponsor for its Indy car and three-time World Champion Jackie Stewart turning down $2.5 million to come out of retirement, it is gratifying to bring you a story about an Air Force E-4 competing on the track that will host this year's German Grand Prix.

Putting the "fine tuning" touches on his Eldon Formula Ford, Kwiencinski checks for all last minute maintenance needed before the race.

(near right) **A1C Bob McHugh** holds the straps as Sgt Robert "Ski" Kwiencinski prepares to buckle up for the race.

(far right) **Smoke and water** sprays from the wet surface at Hockenheim as the racers pass the starting line. "Ski" Kwiencinski is driving the light-colored car closest to the guard rail.

Text and U.S. Air Force photos by
SSgt BEVERLY A. WILLE

"A lot of work for nothing." is how you might feel if you were Sgt Robert "Ski" Kwiecinski, a comm center equipment repairman assigned to the 1st Combat Communications Squadron at Lindsey AS, Germany.

Ski races Formula Ford cars in his spare time. After many hours of work before each race, he still doesn't get discouraged if he doesn't win.

Recently, Ski and his part-time mechanic, A1C Bob McHugh, also from the 1st CMBTCS, spent another Saturday at the race track, preparing and racing Ski's Eldon race car while meeting old friends and making new ones among the drivers. This was to be an especially competitive race since many of the entrants were veteran international drivers.

The track at Hockenheim is more than 100 miles from Lindsey, but Bob and Ski made the trip, had the car inspected and approved for the race, and performed a few minor adjustments by 8:30 a.m.

The cold, rainy weather was far from ideal for racing, yet the excitement of the crowds, the activity in the Grand Prix-style track's midway, and the action in the pits kept everyone too busy to worry about the weather.

By midmorning, the qualification trials were over and Ski had qualified for the race. This was not an easy task since it was an international meet with some of the best drivers in Europe competing.

After the trial run, Ski made a few adjustments on the Eldon to compensate for the wet track. Then the pair from Lindsey joined some of the other drivers, mechanics, and fans for wurst or gulashesuppe and racing talk at the gasthaus near the track.

Although he got off to a good start, Ski was not to add another victory to his list that day. After he completed the ninth lap, an engine hose burst and he was forced to drop out of the race.

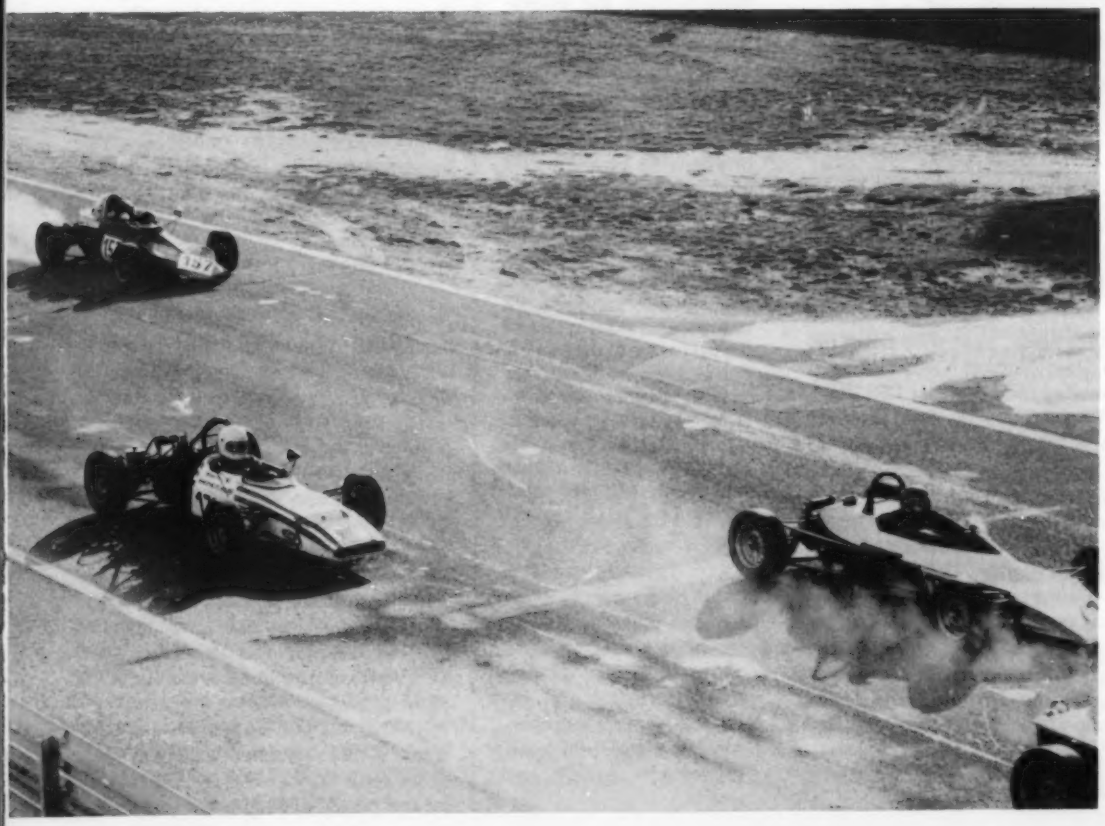
When on-lookers offered their condolences, he merely shrugged and said, "That's racing! We'll be ready for the next one."

Proudly displaying his squadron's emblem on the front of his racer, Ski was a top contender during the first part of 1979. However, due to several TDYs, he was unable to compete in all the necessary races, which caused his standings to drop. Hoping for a better shot at the title next year, he is trying to find a sponsor and a better car.

"It's awfully expensive to run and repair the car, and keep paying the entrance fees," Ski said, "but if I can get a sponsor, the car I need, and some help at the races, I'm sure I've got a good chance to win."

It takes lots of work in the off season to keep the car in shape. Living in the dorm makes it tough because he doesn't have a garage to keep the car out of the weather, so he's looking for some place to keep it. He is also looking for a second mechanic to help him work on the car both prior to and at the races.

Ski has been racing in Germany for almost three years and has placed in the top 10 many times. With some help from his friends, by the time he completes his tour in Germany, the 1st Comm "1" on the front of his car may be his standing in the national Formula racing circuit.



tteecchh!!
DOUBLE TECH Q A

I am very much interested in information, pamphlets, booklets, material that has to do with automobile safety. See, I just recently purchased a brand new 1980 car. I'm interested in safety precautions on the highway as well as safety features that would help insure the driver. I'd appreciate any information from the beginning novice driver to the well-advanced in terms of driving a car. I'm concerned with safety for the driver as well as the passenger. So as a driver of a new car, I'd appreciate you sending me information on car safety as well as what to check for before driving or starting up a car. Also please send me the names and addresses of people/companies I could contact about car safety, maintenance, insurance, driving rules of the road, and car parts that would help insure the driver against accidents.

You came to the right place. Start with DRIVER Magazine Volume One, Number One, and keep reading. Actually finding all those past DRIVERs might be a bit difficult. Knowing that, we continuously stress most of the information you've asked for.

Now, if I were to actually supply you with everything that you've asked for it would probably take a vessel the size of a submarine tender to get it to your aircraft carrier. There is no way to hand you years of information on a silver platter. If you can't find the answers to specific questions in the available back issues of DRIVER, dig into a research project at the library. I'm looking forward to your more precise, experienced questions after a romp in the library. Keep reading!

Car windshields are now slanted to decrease wind resistance. However, this has added to reflected glare at night. Here, in Korea, the local drivers almost never lower their beams in city driving. Wearing glasses, as I do, also increases glare at night. Do you know of any commercially obtainable substance to put on windshields to decrease reflected glare at night?

Glare is caused by light being refracted when passing through one medium into another. For example, a wave of light passing through rain will form a rainbow. Thus, most nighttime light glare problems come from dust in the air or moisture (much like fog, but not thick enough to be seen – yet). Other glare comes, of course, from the windshield glass and any dirt or scratches on it. It also follows that your eyeglasses and any dirt or scratches on them will contribute to the glare. Putting any other substance on the windshield will only make matters worse – although several companies advertise otherwise.

The best solution to your problem is to clear the windshield regularly and make sure you wash those eyeglasses before venturing out for an evening's driving – I do mine. Other than that, you *must* become a pro at following the side of the road instead of the center line when faced with oncoming traffic as well as keeping all interior lights as low as possible. The December 1979 DRIVER should shed some light on night driving.

A final word of caution – if the windshield is more than two years old, think about replacing it. The surface may be far too pitted, adding to the glare.

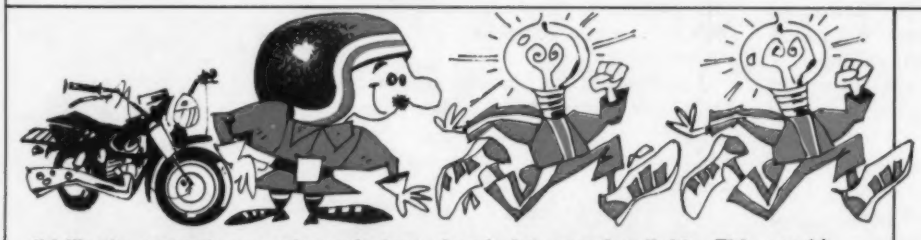
by TSgt RON LATHROP

THAT IS THE QUESTION

Your article about synthetic oil renewed my interest in putting it in both my cars. Do I have to flush out the engine before putting synthetic oil in? What are the disadvantages of it, especially in old cars?

The theories of flushing engines before changing brands or types of oil are as varied as the people you ask. Some say, "Yes," while others claim not. Personally, unless you have been flushing the engine after each oil change, I am against it when changing to synthetic oil. I feel that the excellent detergent qualities of the synthetics allow them to take care of any problems themselves – on the other side of the same coin, the pro-flushers say that because of the excellent detergent qualities you *must* flush the crankcase or face problems. Is it possible for us both to be right and wrong?

The major disadvantage with using synthetics in older engines comes if the engine is using oil already. If so, the synthetic will flow through it like prune juice in a retirement home. And when engines start pumping *any* lubricant that fast, they have had the course. Kiss 'em goodbye.



I'd like to convert my motorcycle turn signals into running lights. This would help me be seen a little better. How about it? Motorcycle dealers all want to sell me big, expensive, new lights. There has got to be a cheaper way.

Sorry about that, but for safety reasons I won't recommend a cheaper way, unless you count mounting an additional set of lights as cheaper.

Here's the deal: For safety reasons, current laws require that items such as car parking lights (which are actually running lights – after all, when was the last time you saw any being used for parking in the continental United States?) remain lit even when the turn signals flash. This can't be done with a simple conversion because your present turn signals have a single filament only. They are either on or they are off. A double filament bulb is required so that one element is on constantly for the running light portion, while the other does the turn signal flashing. A double filament bulb requires a different base plus the additional wiring. This is a major reconstruction job, i.e., big, expensive, new lights.

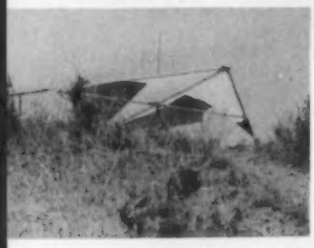
The reasoning behind the law? If you have a single element light that is being used as a running light and it begins to flash as a turn signal, it looks more like a short in the system than a directional change indicator. In other words, the other drivers get a confused message – or worse, no message at all.

Editor's note: Double Tech is a question and answer column in which DRIVER will attempt to make clear some of the cloudy subjects in readers' minds. Unlike other automotive magazine Q&A columns, Double Tech doesn't deal with specific questions such as, "Why is my Wink-Snoozymobile hard to start on rainy mornings?" Instead Double Tech fields questions that are of general interest to the majority of our readers. However, when sending questions to Double Tech be sure to include all available information because this will help in finding the correct solution. If you have a question you'd like an answer to, and you feel others could use the knowledge also, send it to:

Double Tech
DRIVER Magazine
HQ AFISC/SEDD
Norton AFB, CA 92409

As with most magazines, DRIVER has a long lead time between writing and publication, so don't be surprised if it takes several months to get a reply.

getting the hang of it



Remember when you were a kid and used to climb to the top of the tallest tree in the neighborhood and dream you could fly away like a bird? Those long-ago yearnings deep in all of us must be the reason for the popularity of that exciting sport usually known as hang gliding. (We say usually because in some parts of the country it's called sky surfing, kiting, or self-soaring.)

Sailing through the air, suspended from a big, kite-like wing, provides the exhilarating sense of unpowered flight that has fascinated human beings through the ages.

The glider: The most popular type of hang glider is the Rogallo design, also known as a delta wing because of its roughly triangular shape. Francis Rogallo of NASA wasn't thinking of fun when he developed it. He visualized it as a means of carrying parachuting fighter pilots safely away from enemy territory.

The Rogallo design has rigid nose poles flaring out at an angle of about 90°. Slung below the wing is a simple framework from which the pilot hangs, supported in a harness similar to those used on parachutes.

The sail wing glider is similar to the Rogallo but flares out to a broader angle at the nose – from 90° to as much as 180°. This design provides more lift but makes pitch control more difficult. It also results in wider wingspans and increased structural weight.

The swing wing, invented by an engineer named Volmer Jensen, resembles a conventional glider, having a cantilevered wing with a separate tail assembly on the end of a boom. It also features a three-axis control stick that determines pitch, roll and yaw. This is too sophisticated for a beginner, of course.

There are many versions of these basic designs around, plus other styles such as bi-wings, but most people begin with the delta wing because it is simple and stable.

The typical glider is constructed of aircraft aluminum tubing, aircraft bolts, stainless steel cable, and dacron sail. Dacron is preferred to rip-stop nylon because the nylon tends to stretch and sag, messing up the aerodynamics.

The true hang glider is carried and launched by the pilot. If it requires any type of towing device, it's a different sport.

Techniques: The pilot's body does the work in hang gliding. Moving the body forward or backward changes pitch of the wing, tilting it up or down to gain maximum lift. Swinging the body sideways controls lateral direction, banking the wing for turns.

Winds are important to hang gliding and techniques vary according to the terrain and the strength of prevail-

continued

(below, right)
Assembling and preflighting the glider must be done before each flight. Inspect all cable fittings and turnbuckles, cotter pins, cables themselves, self-locking nuts, and all tubing, exposed and covered.

ing winds. Usually, the beginner learns to take off by running down a slope into a slight headwind, holding the kite level and then pushing out on the frame to raise the nose until the glider begins to lift off by itself. It takes a wind of five to 12 mph to become airborne and an average airspeed of 20 mph to remain aloft.

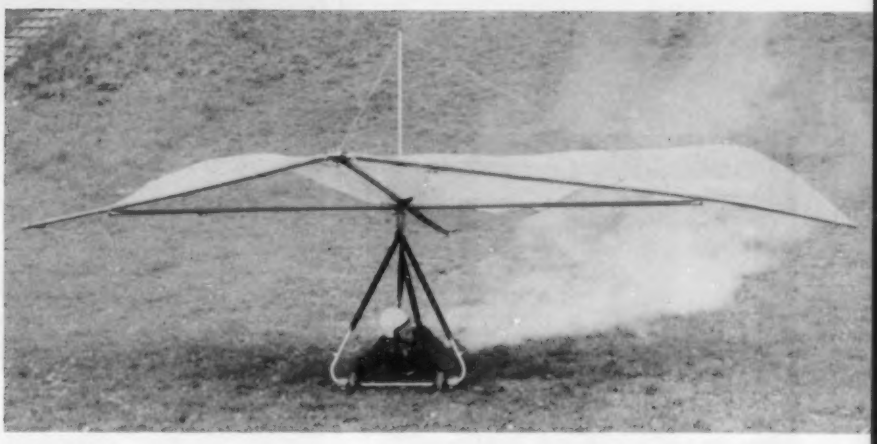
The beginner will probably stay in the air only about five to 10 seconds, although it will seem longer. After he gains some experience, he will be able to take off from bigger slopes and flights will extend to several minutes. Of course, it is possible to stay aloft for much longer but this depends on winds, skill of the pilot and his knowledge of air currents plus the ability to concentrate intently for long periods. Most people who enjoy the sport don't aim toward extremely long flights.

Landing is relatively simple. As the flight nears its end, the technique is to pull down the nose to pick up extra airspeed. This increased speed assures good stability and control during the final approach and avoids the danger of premature stalling. As the glider nears the ground, the pilot levels off to reduce speed, then pulls the nose up into a stall for a gentle touchdown.

A lot of work involved: A day spent hang gliding means a lot of time and hard work assembling and preflighting the glider and carrying it back up the hill after each flight. The breezes you are so glad to have when you're sailing are a pain in the back when you're carting the kite up for another run.

Pilot clips carabiner into glide frame for flight. Harness is much like that for parachuting. Single point attachment is at the apex of the A-frame.

"On my first flight off the hill, I was scared before I took off . . . standing there holding up this awkward thing and looking down at a 100-foot drop. But as soon as you start running, the air gets under the sail, it lifts you up gracefully, and it all seems so easy." From a student on his first day.



(above, left)
This school installs wheels on the A-frame base for their beginners. Wheels are not for normal landings but for times when students lose their footing and end up on their stomachs. Wheels allow one to roll along the ground instead of coming to an abrupt stop, also protects hands.

Some places have installed tows similar to the type used by snow skiers to make it a little easier to return after short flights. After longer flights, the pilot must land, disassemble the kite, attach it to the roof of a vehicle, transport it up the slope, then reassemble and preflight. A two or three minute flight can involve an hour and a half of preparation time and some pretty hard work.

Assembling the glider involves attaching the A-frame (the part one hangs on to), spreading the wing tubes, and raising the king post (the vertical post on top to which the cables are attached). The cables attached to this post simply hold the sail up while not in flight. They will slacken somewhat when the weight is off them in flight. In the air it is the cables underneath that are critical since they are under tension then. Cables on top and bottom must be attached and tightened.

The preflight is an absolute must before each flight. It includes an inspection of all cable fittings and turnbuckles, cotter pins, cables themselves, self-locking nuts on the bolts, and exposed tubing. The hidden tubes inside the edges of the sail are inspected by "feel-up." The fingers are run

continued

"Never fly higher than you're willing to fall" is the old saying among kitemen. This harness has a seat, similar to a child's swing.

(right)
After short flights the kite is reversed to carry it back up the slope instead of disassembling it. This one weighs 30 pounds but many are heavier.

continued

along the tube for any dimples or bends that might weaken it.

Instruction: As with any other sport or hobby, people approach hang gliding in different ways. There are the types who first time out dive off a cliff strapped to a plastic and bamboo rig wearing nothing but their cut-offs. Not only are they taking dumb risks but they are denying themselves the chance to gain the skills that will make them really good at the sport.

Then there are the ones who look for a good instructor, are fussy about the quality of their gliders, use harness and helmet properly, and are fully clothed to protect their skin. These are the ones who return to the slopes weekend after weekend and rarely worry about whether they are carrying their Blue Cross card.

The helmet, incidentally, is not just to save your head in case of a crash. When a kite is being moved around at the take-off area, people frequently get rapped on the noggin with wing tubes. A helmet makes this a minor matter.

If you want to try some hang gliding, by all means look for a good instructor. If you have friends who are experienced at the sport, whose judgment you trust, who have proper equipment and are honestly willing to spend the necessary time with you, that's fine. But the very best thing to do is to pay for instruction from a school or individual whose qualifications you can check out in advance.

Some of the photos here were taken at a school in northern Illinois that charges a reasonable fee for a weekend of training and furnishes all the equipment you will need. In DRIVER's local Southern California area there are clubs that will assign an experienced kite man who, for a nominal daily fee, will work with the beginner and won't turn him loose on his own until he's ready.

Remember that you need to know not just about the actual flying but also how to put the kite together correctly and how to preflight it.

A good instructor will impress you with the need to use a glider made of the finest quality materials. Steer well clear of people who think bamboo poles covered with patched polyethylene plastic are good enough. A good glider can set you back a month's pay. Purchasing the materials separately and building it yourself would probably bring the price down about 40%. But you don't need to own one yourself. Gliders can be rented from schools or clubs. Some schools also will let you apply the rental fee toward the purchase price later if you decide you like the sport.

How dangerous? Make no mistake about it—hang gliding can be a dangerous sport. Jump off into the unknown, maybe from too steep a cliff into turbulent air, and you're in trouble.

USAF experience

Air Force members were involved in nine hang gliding mishaps during 1978 and 1979. Three of these resulted in fatal injuries. In one, a guide cable broke and the member fell 200 feet to the ground. The condition of equipment is of utmost importance in this sport. Preflights are essential.

Another member was killed when he attempted a steep angle of attack, stalled and crashed. This mishap emphasizes the need for expert instruction so that impossible maneuvers are not attempted.

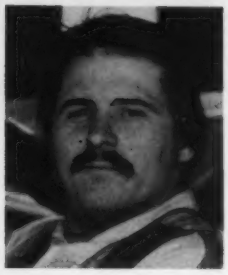
The third member who was fatally injured was not actually hang gliding. His glider was being towed by a 250-foot rope behind a pick-up truck. A gust of wind drove the glider into the side of a building where it crashed to the ground. Areas with trees and buildings are definitely not suitable for parasailing.

Our other six members suffered broken bones in their mishaps. They got in trouble by attempting maneuvers they could not handle correctly or by misjudging air currents. In one case the glider was caught in such severe turbulence that the main spar failed. Enthusiasts should choose their hang gliding location carefully. Mountainous areas which appear ideal may be treacherous because of unpredictable air and the distance the glider will drop if lift is lost.

The effects of changing temperatures and air currents are an important part of hang gliding instruction.

Be careless about your equipment, sloppy about your preflight, and your luck will run out. Let your concentration waver or forget what the instructor told you about hanging on to the frame during a bad landing and that loud snap you hear is likely to be your arm bones.

It's no secret that people get killed hang gliding. It's a sport that is highly unforgiving of errors. As in any other risky endeavor, danger can be minimized by the basic four: Good equipment. Good training. Good physical condition. Good sense.



A REASON "WHY?"

Tim Williamson, who was featured in the January DRIVER story "Rookie Par Excellence," was killed in a racing accident January 12. Tim would have celebrated his 24th birthday the next day.

There is a difference between a racing fatality and the wasting of a human being on the nation's highways.

The difference was best expressed by the late Bruce McLaren's remarks about the death of a fellow racer. In his book *From the Cockpit*, Bruce wrote, ". . . but who is to say that he had not seen more, done more, and learned more in his few years than many people do in a lifetime? To do something well is so worthwhile that to die trying to do it better cannot be foolhardy. It would be a waste of life to do nothing with one's ability, for I feel that life is measured in achievements, not in years alone."

Tim Williamson's achievements spoke for themselves. He lived his life to its fullest. This is not to say he won't be missed. He will. However, his life was not wasted as are so many people's on our nation's highways.

MARINES sharpening – MOTORCYCLE safety habits

by Cpl GREGG MARTIN

Almost everyone once rode a tricycle as a child. From that point on, we are acquainted with wheels as a mode of transportation. In hypothetical sequence: tricycles, bicycles, motorcycles, and for those who never learned to respect them – hearses.

"There are many ways to die," states Staff Sgt Ronald J. Garcia, Marine Corps Air Station, El Toro, Calif., Senior Motorcycle Safety instructor. "Fire, fall, heart attack, etcetera. But, of the 20 deaths that have occurred in the 3d Marine Aircraft Wing since 1 Jan 1979, seven were due to motorcycle accidents."

This statistic has caused commanders great concern and was a major influence in the adoption of a motorcycle safety course at El Toro.

The course was put together by the National Motorcycle Safety Foundation which conducted 899 onsite examinations of motorcycle accidents, studied 3,600 accident cases from police files and spent $2.4 million in 1978 alone in preparation.

Instructed by experienced motorcyclists with at least five years of riding, 21 years of age and 60 hours of training under their saddles, the course is available to any Marine interested in sharpening his or her safety habits – or learning some . . . and the bikes are furnished.

"Fifteen motorcycles ranging from 100 to 200 cc in size were loaned to us from area dealerships for 90 days. At the end of 90 days, we turn them back in and get 15 more, so that way they're always new," said Garcia.

"If a Marine likes and wants to buy the bike he rode during the course, the dealership will usually give him a 10 to 15 percent discount and although it is technically a used motorcycle, they will also warranty it as new," he added.

The course runs a total of 22 hours – 12 in the classroom and 10 on the road. Collision avoidance measures, licensing procedures, military and state requirements for licensing the operator and vehicle and many other subjects are covered in the course.

"Students are also taught proper maintenance of their motorcycle such as lubrication and overall servicing of the engine," said Garcia.

Upon successful completion of the course, cyclists are issued a course completion card that permits them to ride aboard the air station and for which many insurance agencies will grant a premium discount, according to Garcia.

Motorcycles loaned to the 3d Marine Aircraft Wing by area dealerships are given a safety check by Staff Sgt Ronald J. Garcia. Sergeant Garcia is the Motorcycle Safety Course Senior Motorcycle Safety instructor at the Marine Corps Air Station, El Toro, Calif.

(U.S. Marine Corps photo by Master Sgt Bill Grindstaff)

Timely Topics

PHONE NUMBERS

We want to remind you of two important phone numbers:

For information about recalls or significant safety problems involving your car, call 1-800-424-9393.

To report a retail gas station you believe is overcharging for gasoline or which is not posting prices or certifications, call 1-800-424-9246.

Last December 15, the Department of Energy (DOE) fixed at 16.1 cents per gallon the gross margin limit retail dealers are allowed to add to the required taxes and the wholesale price paid by the dealer. The fixed dealer margins will be adjusted semi-annually to reflect changes in the domestic inflation rate. DOE says the gross-margin-limit system will be easier for both the dealers and the public to understand and also for the Department to enforce. It is estimated that 40% of U.S. full-service retail gas prices are charging over the legal limit.

If you suspect you are being overcharged, compare prices at different stations for the same brand of gasoline. Then watch your local paper for DOE's established maximum legal price list. This list, which is released to newspapers at least once and sometimes twice a month, computes the tank wagon price (what the dealer pays), and adds local and Federal taxes plus the 16.1 cents allowable dealer mark-up. Many TV stations also broadcast this information. If you think you are being overcharged, call the hot line and give DOE the information.

BE WARY OF CLAIMS

With most motorists concerned about getting more miles per gallon of gasoline, the promoters of "miracle" devices and additives are having a field day.

But be wary of the claims, warns the Automotive Information Council (AIC), because most of them will do nothing for the car's mileage.

The auto manufacturers have used their best engineering know-how to gain maximum miles per gallon, not only for competitive but for regulatory reasons, said the AIC. By Federal law, each company had to achieve a fleet average of 19 mpg for all its cars in the 1979 model year, so if there was a product which would increase the mileage the car companies would be using it, says AIC.

Peter Hutchins, project manager for the Environmental Protection Agency, which has tested more than 100 of the items, said "We have not found one that gives fuel-economy improvement. The one thing I can say on all the testing we've done on these things is they don't help. These guys are preying on the hysteria of the population. It annoys me the public is this gullible."

As a result, the Federal Trade Commission has started actions against some of the makers and marketers. One of those slapped down is L. Gordon Cooper, the former astronaut, whose testimonial for an air-bleed gas-saving device was called false and misleading by the FTC.

Many of the gadgets are of the air-bleed type, which it is claimed will give better gasoline mileage by adding more air to the gasoline.

EPA's Hutchins said the car makers already have "leaned out" the air-fuel mixture to meet air-pollution standards. Adding more air can cause engine hesitation.

AIC says the best way to achieve maximum mileage is to follow rules of common sense by avoiding excessive acceleration and braking, reducing use of air conditioning, keeping the car in shape by following the recommended intervals of service, and maintaining proper tire pressure.

(California Highway Patrolman)

DOUBLE CLUTCH

continued from page 2

just that. On the other hand, 45 minutes from our office is an airport where so many private airplanes are landing and taking off that the airport is advertised as the busiest in the country. Who is encouraging conservation there? Another 20 minutes down the road one comes to dozens of marinas and yacht clubs. How much fuel could be saved if Americans curtailed recreational boating?

If you have views on the subject, we'd like to hear from you.

HOW IT HAPPENS!

Staff Sergeant Joe Curzwild has just re-upped for four years. He decides, "I'll make use of the reenlistment bonus and put it down on a new car before I waste it all." He is driving his new Z-28 back to the base to show the guys at the barracks.

The weather is cold, there's ice everywhere and it begins to snow. Rounding a curve near the base, SSgt Curzwild loses control and fishtails. A motorist coming from the opposite direction can't avoid him and impacts with the Z-28 at the left rear fender. SSgt Curzwild was using the belts on the new car and he suffers only minor bruises and cuts, but the Z-28 suffers about $2000 damage.

Where did SSgt Curzwild go wrong?

A. He reenlisted.

B. He didn't buy any snow tires.

C. He didn't know this new, unfamiliar car.

D. He was speeding.

Okay, we're great believers in snow tires, and that might have helped, but not enough. And it *was* a new car and he didn't know it that well. But considering the capabilities of the car he chose, our answer would have to be D. No matter what the *posted* speed limit, the *safe* speed was lower, because of the snow and ice. He'll know better next time, but it was an expensive way to learn.

LIGHTS

(above)
Most people think of their headlights only when one of them burns out. However, aiming of the beams is also critical. If the lights are too low or too far to the left or right the driver won't be able to see obstructions in time to take evasive action. On the other hand, if the beams are aimed too high they glare in oncoming drivers' eyes.

Are you a little fuzzy about which bulb to buy? If so the individual behind the parts counter should be able to help if you can provide some basic facts. For example, is the burned out bulb round or rectangular and are there two or four headlights? If there are four, which one is to be replaced? Inside, outside, top or bottom?

The Backyard Mechanic

Replacing automobile headlights is as simple as turning a screwdriver. Aiming them correctly is also relatively easy.

First of all there are some of you out there that can't be trusted to buy the correct lamp for your vehicle. However, everybody should pay close attention as I feel a quiz coming on.

Walk to the front of the car and take a good, long look at the lights. They'll either be round or rectangular. Remember which. Better yet, write it down on a slip of paper. Now count the number of headlights. There should be either two or four. If you get a number different than two or four you've counted something that isn't a headlight or your vehicle has an auxiliary lighting system. (A little hint here: Auxiliary lights are usually not built into the body of the car, while headlights normally are built in. There are exceptions to this, but the people that buy the cars that are the exceptions usually know it to begin with.)

With six you get a headache: If they are round and there are two of them, you'll need 7-inch replacement lamps. But if there are four round headlights, it is the 5¾-inch model that will be required.

Should your vehicle have two rectangular lights, then you'll need 200mm replacements. Four rectangular lights call for 4x6-inch replacements.

With both round and "square" two-light systems, there is only one type of replacement bulb; however, the four-light models come in two types. One is a low/high light, while the other is a high beam only. How do you know which you need? Simple: the lights closest to the sides of the car (or top, on some) are the low/highs, while the inside or lower lights are highs only.

Question: A vehicle has four, round headlights. The left light, closest to the grille is burned out. What replacement lamp is required?

A. 200mm "square"
B. 7-inch round
C. 5¾-inch round low/high
D. 5¾-inch round high

Answer: D. The quad-light systems use the smaller bulbs with the low/high beams mounted as far to the sides of the vehicle as possible, and the high-beam-only lights mounted inside or below the others.

Out with the old, in with the new: Whether you're replacing a burned out bulb, installing brighter halogen sealbeams or European-style headlights, the steps to take out the old, put in the new are the same.

But before we get started, a few words about screws. Most automobiles are put together with Phillips head screws which allow machine assembly. The head can become clogged with sand and dirt making it difficult to get at. The more serious mechanics might consider replacing the Phillips head screws with slot head types.

Additionally, almost all the screws in the headlight assemblies are exposed to road splash and are frequently rusted. It is wise to spray them with rust-penetrating solvent before even thinking about turning them. Whatever you do, don't force them or you could ruin the mounting threads.

Those of you with concealed headlights are going to have to find a way of keeping the cover open while working on the lights. Most manuals will tell you how to accomplish this. If not, almost any mechanic or service manager can provide such information over the telephone. Sometimes it's easier to just remove the cover.

To get at the light itself, remove the headlight body molding. It is usually held in place by sheet metal screws. Once you've put the molding aside so that you don't step on it, remove the retaining ring screws and the retaining ring. Now all you have to do is carefully pull the headlight assembly out and unplug it from its wiring assembly.

Plug the replacement lamp into the assembly and carefully push the unit back into the adjusting ring where the other bulb was removed. There are glass tabs on the replacement bulb that help position the lamp when properly aligned in the adjusting ring slots. Put the retaining ring over the bulb and install the attaching screws.

Another word of caution: Don't over-tighten the retaining ring screws when installing quartz lights. The lead crystal lens of these lights get hot when operating and the stress from over-tightening can easily lead to cracking from vibrations or even cold water splashes.

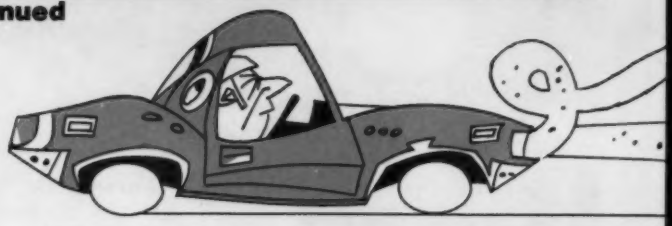
At this time you have to decide if the molding allows access to the adjusting screws when it is in place. If not leave it off until the headlights are aimed, otherwise put it back on. The same with the door or cover, if you removed it.

Ready, aim, light: As few backyard mechanics are going to lay out $500 for a track-type aimer, headlight alignment will be limited to the portable aimer or casting shadows on a wall. Neighboring backyard mechanics with more than one car per family might pool their resources for a $100 portable aimer. However, most of us will have to trek to the auto hobby shop to use one.

A versatile device, this system contains two aimers, with adapters for two- and four-lamp systems, rectangular headlights and floor slope measurement. *Floor slope measurement?* Yes, floor slope measurement. It's like this: if you aimed the lights while the car was on a hill, they would be properly aimed only for that hill. Therefore, you must either have the car level when actually aiming the lights or make adjustments for the slope. Which brings up another good point: Always have the tires properly inflated and at least half a tank of gas in the tank before attempting to aim the lights.

You start the aiming process by placing one of the aimers with floor slope measurement adapter beside the front wheel and the other beside the back wheel. On the same side of the vehicle, of course. Then level each adapter with the built-in bubble level and adjuster. Now look into one aimer turning the dial until the image from the other aimer is lined up. The dial

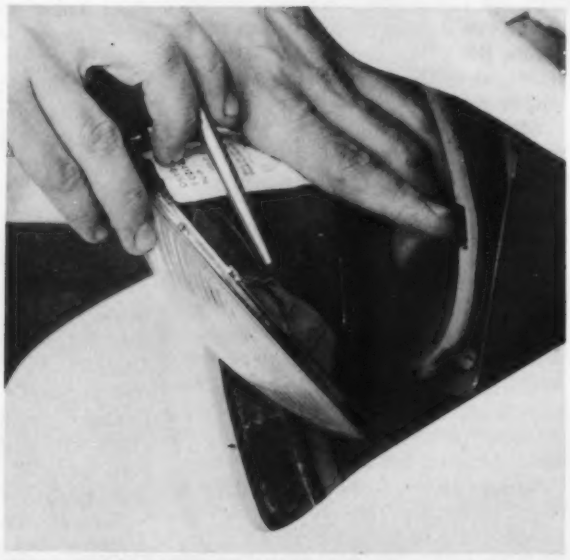
continued



After insuring that the door will stay open, remove the headlight body molding to get at the lamp.

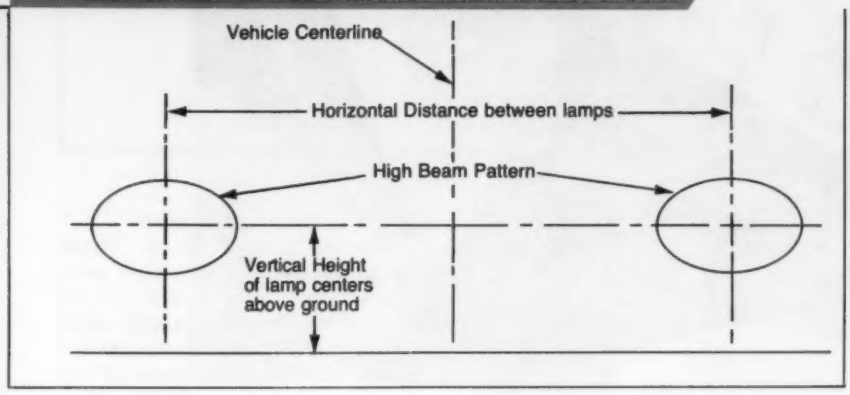
Having removed three screws, you can now remove the headlight retaining ring.

Pulling the lamp slowly from the housing, simply unplug it and plug in the replacement.



When pushing the bulb back into the housing be sure to align the tabs on the light with those on the housing.

HIGH BEAM AIM AT 25 FEET



reading is the slope of the floor. This reading is then dialed into the aimer to automatically compensate for the floor slope during alignment.

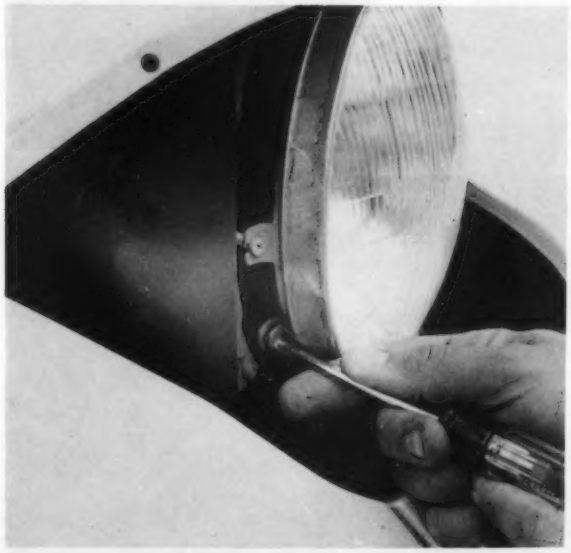
The aimers can now be attached to the headlights via a special suction-cup arrangement. For vertical adjustment, turn the screws until the bubble is level. Horizontal adjustment is aided by a set of mirrors and a split-image focusing arrangement. When properly aligned, the reflected image from the opposite-side aimer split by the mirrors will be lined up.

Zapping the garage door: Now there are ways of aiming headlights without all this fancy equipment – provided you have the time. First you'll need a level area about 50 feet long and a "screen." This level area will have to be easy to get to and easy to find reference points on. This will allow you to duplicate the set-up in the future. The screen can be anything – the garage door, a wall or a piece of plywood a few inches wider and taller than the front of your vehicle.

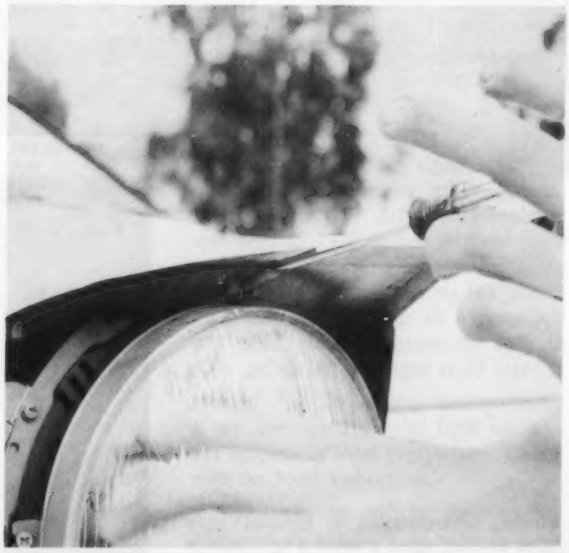
Ideally, you would first take the car to a professional for aiming. Then you will position the vehicle on your level area, square with the screen and mark on the screen the center of the beam patterns. If you don't want to mark up your garage door, you might position plywood or cardboard in front of it as the screen. It is also a good idea to mark on the back of the screen the exact position of the car in reference to the screen to make future duplication easier.

You'll develop a marking system that best suits you. But if you are looking for a place to start, why not mark the center of the low beams with an

continued

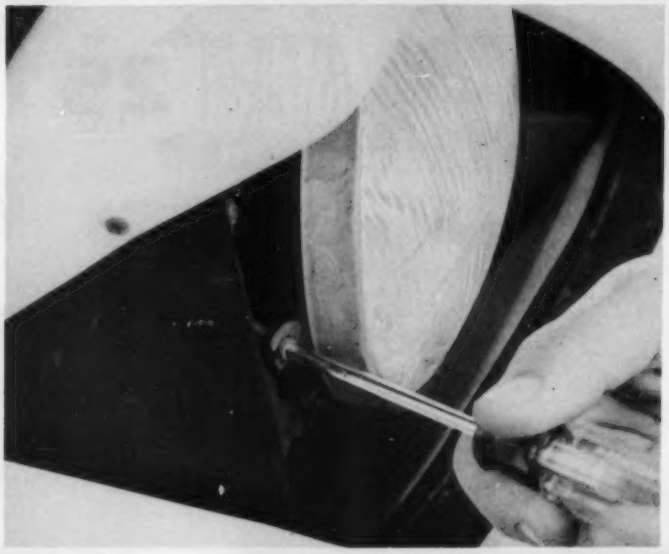


If you are installing European-style quartz lights be careful not to overtighten the retaining ring screws. The lead crystal lenses of these lights get hot and the stress from overtightened screws can easily crack them.

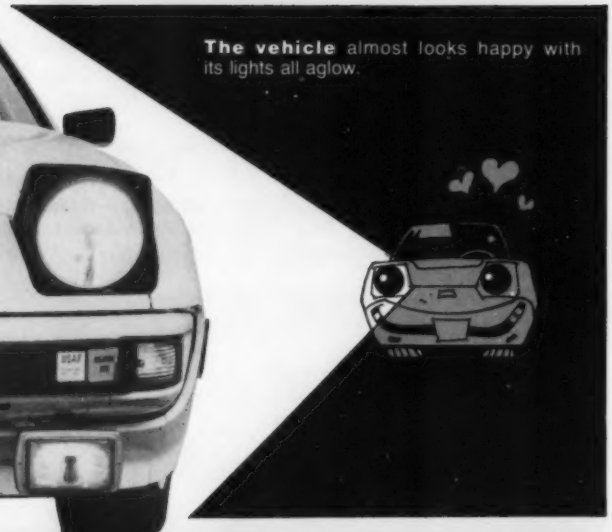


Raising or lowering the beam pattern is accomplished by turning the adjusting screw at the top of the assembly.

Now that you've purchased more light, how do you get it to shine on your subjects?



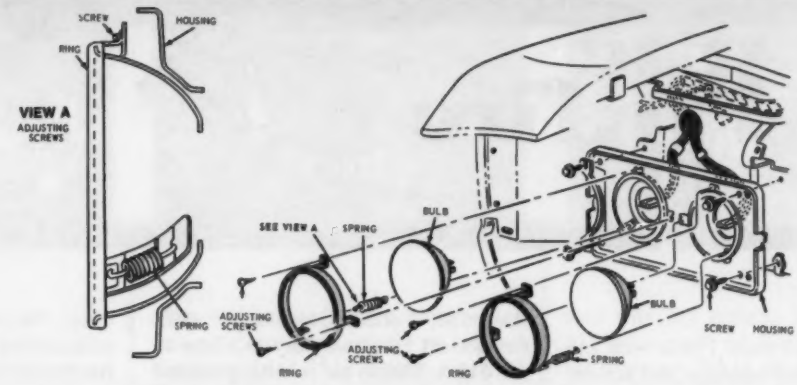
Horizontal alignment of the lights is accomplished via adjusting this screw on the side of the assembly.



The vehicle almost looks happy with its lights all aglow.

Aiming instructions for European-style lights and fog lights provide a light pattern with a distinct cutoff that is excellent in foul weather. The light almost seems to cut through rain, snow and fog without bouncing into the driver's eyes.

TYPICAL HEADLIGHT ASSEMBLY



"L." Similarly, the centers of the high beams can be marked "H." What about four headlight systems? Cover the low beams when marking for the highs. The reasoning is simple: If the low beams are aimed correctly, they'll also be correct when switched to high.

OK, now the next time you want to aim your lights, just duplicate the set-up and adjust the beams to your centering marks.

All of this done with the front of headlights 25 feet from the screen.

Cutting the expense: If you don't want to pay for a professional aiming you can still use the screen method. Most shop manuals will have the light pattern and measurements in them. Don't happen to have a shop manual? Well, on high beam at 25 feet in front of the car, the center of the light pattern should be at the same vertical height as the headlight centers and at the same horizontal distance between the headlights divided equally by the car's centerline. See the diagram on page 25.

Aiming European headlights: For those of you outside the continental United States here are some tips on aiming your non-sealed beams. These tips are ideal "ballpark" aiming hints. You would be well advised to check with local officials regarding laws and regulations covering headlight aiming.

The H4 headlights (those with both low and high beams such as the 7-inch rounds) are aimed on low beam as the high beam function will more or less fall into place. Aim them ½-degree down and straight ahead. The half degree works out to about 2⅝-inch at 25 feet.

For those quad light cars that have H1 high beams, aim the high/low outside lights as with H4, because that is what they are. Aim the H1 inner beams parallel to the ground and straight ahead.

Aiming auxiliary lights: The screen may also be used for aiming auxiliary lights such as driving and fog lamps. Again, the aiming stated here is for "ideal" use; check with local authorities about the rules covering these units.

Driving lights used almost exclusively for long range should be aimed parallel to the ground and straight ahead. Driving lights used as cornering lamps should also be aimed parallel to the ground but 3 to 5 degrees left and right, respectively. That's from 15¾ to 24½ inches off center at 25 feet. An alternative is to criss-cross the lights 10 to 20 degrees. That works out to 52⅞ to 109⅛ inches at 25 feet.

Fog lights are another story. First of all, most states with laws regarding fog lights require that the "light beam (measured a maximum of 25 feet in front of and to left of center of vehicle) not to be above a point 4 inches below the center of the fog light." If you can come up with a concrete aim from that, tell me. And that is also why we continue to advise checking with local authorities – and the guy that sold you the lamps isn't the kind of "authority" we have in mind – we mean legal authorities.

For the best maximum foul weather effectiveness, aim fog lights ½-degree down and 0-3 degrees left and right. That's above 2⅝ inches below center and zero to 15¾ inches left and right at 25 feet. If, however, you're using your fog lights as cornering lamps aim them parallel and 5 to 10 degrees left and right. That translates to 26¼ to 52⅞ inches left and right at 25 feet.

Again, all the aiming measurements given here are for ideal light use and not necessarily legal everywhere. Check with the local authorities.

And, yes, we will be covering installation of auxiliary lighting systems in the near future.

In conclusion, good aiming and better night visions.

Properly aimed headlights and auxiliary lamps do NOT give you the right to become a "dim-or-I'll-blind-you" enforcer. It is far better when faced with another motorist who refuses to dim his high beams that you seek the shadows of the road's edge (as explained in the December 1979 DRIVER article "How Well Do You See After Dark?") than for both of you to be blinded.

As far as the laws go, most states require that driving lights be extinguished along with normal high beams within 500 feet of oncoming vehicles. Fines for not doing so are often higher than speeding penalties.

And a final plea for sanity: Never, never use high beams or driving lights as weapons against your fellow motorists, please.

LETTERS to the EDITOR — BACKfire

HEAVY SNOW

Over the past 12 years I have read and enjoyed the many technical and not-so-technical articles provided by your excellent publication.

In "The Freezin' Season" article (Oct '79) you correctly advised to sweep ALL the snow from a vehicle before starting out. The reason given, although valid, seems secondary to what I have heard from various sources concerning the practice.

The added weight of the snow on the hood, roof and trunk lid compresses the springs causing geometry changes, reduces suspension travel and can seriously change the center of gravity. In wet snow conditions the added weight could be in the neighborhood of 350 pounds.

It is also a good practice to knock out the slush buildups behind the wheels and in the front wheel-wells since this can restrict the steering arc. There are enough hazards to winter driving without starting out at a disadvantage.

Keep up the good work!

TSgt Brian D. Silver, USAF
Box 4428, 406 TFTW
APO New York 09286

Very true and we certainly should have mentioned both points.

DOUBLE JEOPARDY

I read the article on "Double Jeopardy" in your very excellent magazine. I always take a couple of minutes to read it when I find one lying around.

I can't say that I like what the military does in this case. I also don't agree with what Roy Zorn said about it in his letter in the Dec '79 issue either. I believe that if I do something bad enough to have my license taken away that I also lose my base driving privileges too.

But in all fairness, if I go downtown and get caught for speeding and get fined $50, I don't think that the military should take away my privilege to drive also. That to me is being punished twice, hence "double jeopardy."

Keep up the good job. I hope DRIVER Magazine stays with us for awhile and wish there were more of them to go around.

Robert Libold, USAF
PSC Box 1031
England AFB, LA 71301

FUEL CONSERVATION

I am sure that you can explain my frustrations much the same as you did CMSgt Treado's in your Nov '79 DRIVER. I understand that possibly in the past you have written numerous articles on fuel conservation. Your "Coping With A Gas Crunch" in the October issue was excellent. However, I find it hard to understand why we are attempting to glorify and even promote something as "fuelish" as ice racing, not to mention "Mom's A Race Driver."

It is extremely difficult for me to motivate my work force to turn off the lights, reduce the thermostat, ride a bus to work, etc., when official publications are still glorifying such unproductive events as ice racing. I am not so naive as to think that American youth (at whom your publication is directed) will voluntarily suspend drag racing, souped-up cars, and all the other challenging and "fuelish" experiences which youth figure they must be part of. I just do not think the Air Force should promote or support same.

Col Robert E. Uptmor, USAF
HQ SA-ALC
Kelly AFB, TX 78241

We have attempted to explain our position in the "Double Clutch" article in this issue.

MOTORCYCLE SAFETY

After reading the Dec '79 issue of DRIVER, I feel obligated to comment. On page 3, the picture of the motorcyclist really made me nervous. His choice in footwear left a lot to be desired, as did the position of his feet. What really bothered me was the luggage he chose to hang from his shoulders. If he ever went down dressed as he was he would "roll" like a football. But who knows, maybe he would enjoy wrapping those straps around his neck. Wonder if he ever attended a motorcycle safety course? If not, he should. Along those same lines, do you know if any courses have been developed to educate the automobile driver to recognize a motorcycle when he/she sees one? The ". . . but, Officer, I didn't see him . . ." is beginning to wear a bit thin.

With the number of motorcyclists on the increase, and the number of automobile vs. motorcycle accidents on the rise, it would seem that an awareness program be directed toward the biggest cause of automobile/motorcycle accidents – the automobile driver. Education for the motorcyclist has come a long way in recent years; now, it's time for the automobilist.

MSgt Max R. Essex, USAF
Motorcycle Safety Instructor
35 TTG/SEGT
George AFB, CA 92392

The photo Sgt Essex mentions is of an unknown rider sharing a lane with our photographer's car on the Hollywood Freeway. He's carrying two shoulder bags. So far as the "but, Officer, I didn't see him," the Tech Ed agrees and says, "What does the officer expect the motorist to say? 'Sure I saw him, but I ran over him anyway'?"

Your concern for the lack of awareness on the part of the automobile driver is well placed. We recognize the problem and are trying to educate our drivers to be alert and to "see" the motorcycle riders. This topic is addressed in traffic safety courses currently in production and will be included in future courses.

CHAIN MAINTENANCE

After reading "The Backyard Mechanic, Part 2," in the December issue of DRIVER, I feel that there is at least one more word of caution you should convey to your readers concerning chain maintenance.

I have been riding touring bikes for ten years, and every time I speak with other riders I hear a horror story concerning certain dummies who insist on wiping the excess lubricant off of their chains with a rag. It seems that in order to preserve the aesthetic appearance of a clean rear wheel some folks like to lube the chain, elevate the rear wheel, put the bike in gear, and while the wheel and chain are moving hold a cloth on the chain to remove the excess grease!

Invariably, the story ends with the cloth being caught in the chain and the neophyte mechanic getting his/her fingers chopped up by the final drive sprocket. Needless to say, it's almost impossible to reach the shut-down controls when your paw is stuck between the chain and sprocket, and the usual result is to reduce a perfectly good clutch/throttle hand to a quivering mass of ground round.

To me, the aesthetic pleasures of a hand with the full complement of issued digits will always exceed those of a shiny rear wheel. Don't even *think* of playing this game as you're bound to lose.

2d Lt John A. Rice Jr., USAF
323 Air Base Group
Mather AFB, CA 95655

NIGHTTIME DRIVING

As one who does considerable after-dark driving, I found your article in the December DRIVER, "How Well Do You See After Dark?" of much interest.

I was a bit perplexed, however, that the article overlooked several points to improve the car's own lighting in the driver's favor. First of all, many states now permit the installation of the quartz-iodine headlight system, which makes a vast improvement in forward illumination. (My home state of Oregon was one of the first; I had them in my Land Cruiser and now in my Riviera, and wouldn't drive without them.)

Secondly, the backyard mechanic can remove the turn signal and running light assembly, and give them a high polish to increase reflectivity. It also allows a chance to see if any seepage has occurred to cut down the light from these assemblies (yes, there was: undercoating, believe it or not!).

While you mentioned turning down dash lights to eliminate glare, it should be pointed out that some car dash designs are guilty of throwing light onto the windshield as well, due to "vanity and vinyl." The pro night driver will coat his dash top with a flat black coating to eliminate the reflections. The parttimer can effect the same thing by using a couple of small handtowels taped to the dash, of some dark color, preferably black, dark blue, dark brown, possibly dark green.

Yup, nighttime driving can be fun within the bounds of safety. But for the person who gets careless, there's the knowledge that there *is* a darker place to be: the inside of a coffin.

MSgt Douglas K. Howard, USAF
PSC Box 1161
Ellsworth AFB, SD 57706

A timely letter, since this issue devotes a lot of space to the subject of lighting. Incidentally, it is federal law that says what kind of headlamps are legal. The Department of Transportation issued a warning in December '77 that they would crack down on imported headlamps that do not have sealed beams and with over 150,000 candlepower, although some states were allowing them.

GLAD TO BE ALIVE

On 22 Dec '79 while traveling alone to Portland, Oregon to spend Christmas with my parents, at 0530 hours, 5½ miles north of Pasco, Washington on Highway 395, I hit a spot of black ice and rolled my new 1979 Toyota Celica Supra. Road surface was dry with the outside temperature at 27 degrees.

The Washington State Highway Patrol Investigative Officer stated in his report that had I not been wearing my seatbelt/shoulder harness I'd have been killed instantly. Speed at time of incident was 45 mph. Damage to my vehicle was $5,690. Personal injuries sustained: bruised left and right leg, and a bump to the head.

I never realized how important safety belts were until now. Don't let something like this happen to you to open your eyes to the use of safety devices. I'm glad to be alive and my car can always be replaced.

REMEMBER TO BUCKLE UP FOR SAFETY!!

SSgt James R. Poppino, USAF
341st Security Police Squadron
Malmstrom AFB, MT 59402

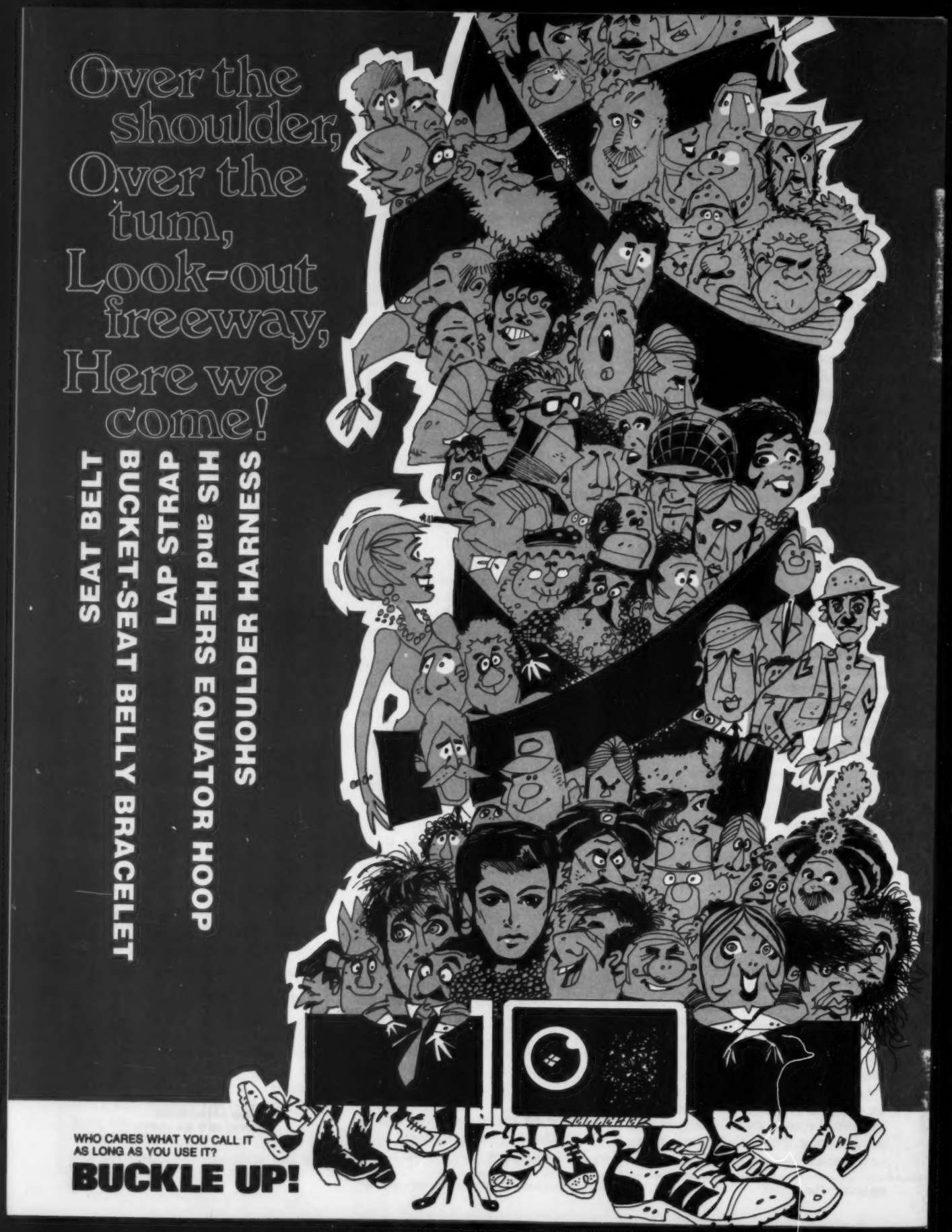
PHONE LOCATIONS

Enjoyed your "Driving in Germany" article in the November '79 issue of DRIVER. Unless changes have been made, you neglected to tell your readers that arrows on posts along the autobahn right-of-way tell one which way to walk to the nearest telephone. For example:

Mr. John J. Lieb
2052 Buggywhip Lane
Enid, OK 73701

Address your letters to:
Editor
DRIVER Magazine
HQ AFISC/SEDD
Norton AFB CA 92409

☆U.S. GOVERNMENT PRINTING OFFICE: 1980—683-215/4


Over the shoulder,
Over the tum,
Look-out freeway,
Here we come!
SEAT BELT
LAP STRAP
BUCKET-SEAT BELLY BRACELET
HIS and HERS EQUATOR HOOP
SHOULDER HARNESS
WHO CARES WHAT YOU CALL IT
AS LONG AS YOU USE IT?
BUCKLE UP!